

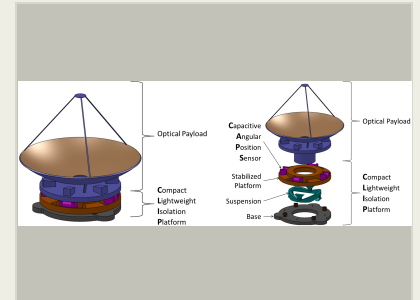
Compact, Lightweight Isolation Platform (CLIP), Phase II

Completed Technology Project (2014 - 2016)



Project Introduction

NASA has a critical need for improved bi-directional data transmission rates from a variety of spacecraft to Earth. NASA estimates that the current Mars to Earth transfer rate of 6 Mbps might be increased to 600Mbps using a Laser Communication (LC) system. Beam jitter caused by spacecraft-based motion must be reduced to sub-microradian levels to enable beaconless optical beam pointing. ATA will create a Compact, Lightweight Isolation Platform (CLIP) that will host the LC collimator telescope and provide a stabilized platform to prevent the 150-microradian spacecraft disturbance environment from reaching the LC terminal. To enable that stabilization, ATA will develop an ultra-low angular noise Capacitive Angular Position Sensor (CAPS). The proposed sensor will have low power and high reliability, which ATA will demonstrate by producing TRL 4 prototypes in Phase I and TRL 5 CLIP engineering development unit (EDU) in Phase II. The integrated CLIP overall design is a major innovation. Most significantly, the platform payload capacity must increase from the typical few hundred grams to as much as 50 kilograms, roughly two orders of magnitude, but without major growth in the mass of the platform itself. While the payload for most stable platforms is only a small fraction of the platform overall mass, the CLIP payload must be from more than half (3 kg) to as much as 94 percent of the total platform mass (3-50 kg payload + 3 kg platform). Combined with the large payload range, the needed disturbance rejection from 150-microradian to less than 0.5-microradian across the broad frequency range of 0.1 to 500 Hz requires innovation in the platform suspension, high-performance actuators, servo controls, and structure. Other programs have demonstrated these requirements individually, but the innovation CLIP provides is to combine structure, suspension, actuators, and sensors to give the required performance within the stringent 3-kg weight and 15-W power constraints.



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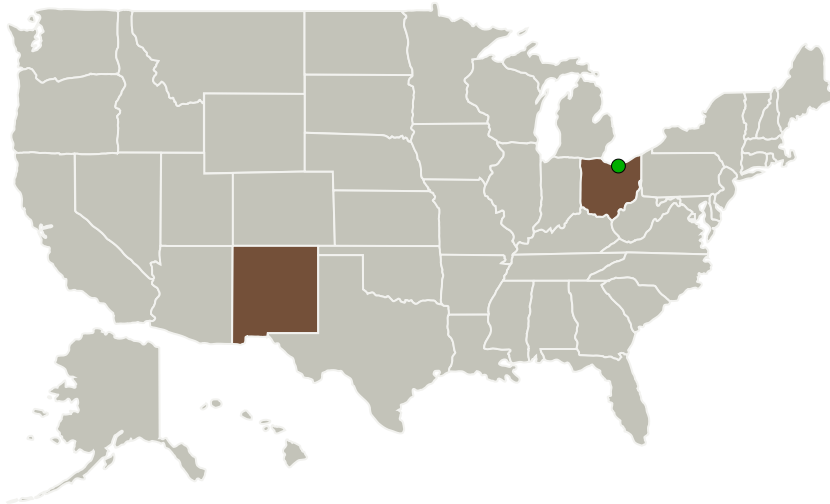
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Applied Technology Associates	Lead Organization	Industry	Albuquerque, New Mexico
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

New Mexico	Ohio
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Project Transitions

▶ **April 2014:** Project Start

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Applied Technology Associates

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

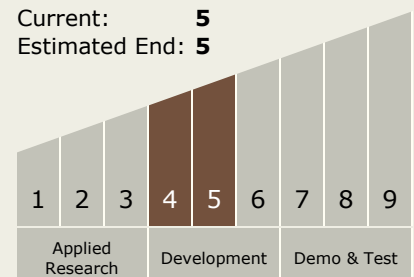
Carlos Torrez

Principal Investigator:

Nick Jacka

Technology Maturity (TRL)

Start: **4**
 Current: **5**
 Estimated End: **5**



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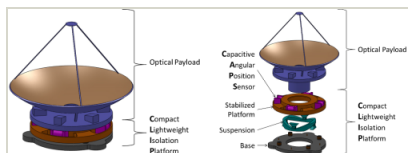
✓ **December 2016:** Closed out

Closeout Summary: Compact, Lightweight Isolation Platform (CLIP), Phase II Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/137501>)

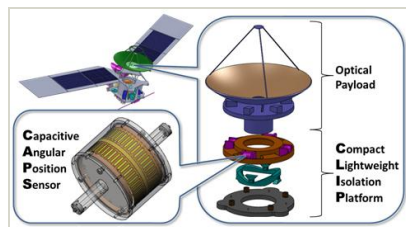
Images



Briefing Chart Image

Compact, Lightweight Isolation Platform (CLIP), Phase II

(<https://techport.nasa.gov/image/133763>)



Final Summary Chart Image

Compact, Lightweight Isolation Platform (CLIP), Phase II Project Image

(<https://techport.nasa.gov/image/133599>)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.1 Optical Communications
 - └ TX05.1.4 Pointing, Acquisition and Tracking (PAT)

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System